

REMARKS

Claims 1-16 and 26 are pending in the present application. Reconsideration of the application is respectfully requested in view of the following responsive remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

In the office action of August 10, 2005, the following actions were taken:

- (1) Claims 1-5, 13-16, and 26 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,280,784 to Yang (hereinafter "Yang"); and
- (2) Claims 6-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Yang in view of U.S. Patent No. 5,287,435 to Cohen (hereinafter "Cohen").

It is respectfully submitted that the presently pending claims be examined and allowed.

Present Invention

Claims 1 and 26 of the present invention teach a solid freeform fabrication system for producing three-dimensional objects. The system includes a dispensing system or means which separately dispenses build material and support material. The dispensing system is an ink-jet printing dispensing system. The build material and the support material are adapted to contact one another at an interface after being dispensed. The system further includes a curing system which is adapted to harden the build material after it is dispensed but before the support material is dispensed. This feature is an important and novel feature of the present invention as it prevents mixing between the build material and the support material at a lateral interface, thus reducing the jaggedness of the three-dimensional object that can be caused by liquid bleed between the support material and the build material during fabrication.

Rejection under 102(b)

The Examiner rejected claims 1-5, 13-16 and 26 under 35 U.S.C. as being anticipated by U.S. Patent No. 6,280,784 to Yang et al. (hereinafter "Yang"). Before discussing this rejection, it is thought proper to briefly state what is required to sustain such a rejection. It is well settled that "[a] claim is anticipated only if each and every

element as set forth in the claims is found either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). In order to establish anticipation under 35 U.S.C. § 102, all elements of the claims must be found in a single reference. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986) cert. denied 107 S.Ct. 1606 (1987). In particular, as pointed out by the court in *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1981), cert. denied, 469 U.S. 851 (1984), “anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference.” “The identical invention must be shown in as complete detail as is contained in the...claim.” *Richarson v. Suzuki Motor Co.* 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

Yang teaches an apparatus or system for making 3-dimensional food objects. In one embodiment the apparatus can be adapted to include multiple extrusion nozzles. The Examiner has asserted that the injection nozzles (188A and 188B) of FIG. 4 would read on ink-jet print heads. The Applicants respectfully disagree with this assertion. Ink-jet printer heads operate to deliver liquids or liquid dispersions to surface mediums by jetting means such as thermal ink-jet or piezo ink-jet processes. The nozzles of FIG. 4 extrude the soft solid food composition (see example 5) in a manner that is clearly distinct from jettable printing. Extrusion devices use mechanical or other similar means to push a soft solid through an orifice. Ink-jet devices typically “spit” small discrete amounts of fluid as drops using thermal energy or piezoelectric means, for example. Applicants assert that one skilled in the art would not associate the use of food extrusion nozzles as being synonymous with ink-jet printing heads, and thus, the disclosed extrusion nozzles in no way anticipate the claimed ink-jet printing dispenser. As a result, Yang does not anticipate presently pending claim 1 or claim 26.

In addition, Yang does not expressly teach the curing of the build material prior to the application of the support material. Independent claims 1 and 26 both require the element of curing the build material before the application of the support material. Page 7, lines 16-29 of the specification of the present application explains why this feature is significant.

At various stages during the fabrication of the three-dimensional object being formed in FIGS. 1a to 1f, junctions or interfaces 10 between the build material

14 and the support material 16 on the same layer are present. It is at these interfaces where build material and support material can be subject to cross-bleeding of one material into the next. In systems of the type shown above where the build material and the support material are solidified or cured simultaneously, there tends to be a fuzzy or rough surface formed on the vertical walls (where the build material interfaces at its vertical surfaces with the support material). This is especially true in systems where both the build and support materials are cured directly from a liquid state, or otherwise solidified simultaneously. In accordance with embodiments of the present invention, an alternative method which cures the build material and support material in separate steps can be carried out to significantly reduce this problem. This recognized solution allows for improved surface finish and dimensional control.

Yang, does not teach this critical element. The Examiner noted in the office action that Yang does teach curing (which is more accurately a step of "drying") the extruded food by heating the food with hot air as shown in Figure 2. Although Yang does teach the use of hot air to dry or cure the extruded food, nowhere in Yang does it teach the importance of curing the build layer prior to the application of the support layer so as to avoid the problems laid out above. Thus, Yang fails to teach both ink-jet printing as the dispensing means and curing of the build material prior to the application of the support material. Therefore, as each and every element of the rejected independent claims is not found in Yang, and as claim 3-16 depend from independent claim 1, it is respectfully requested that this rejection be withdrawn and all the rejected claims be allowed.

Rejections under 103(a)

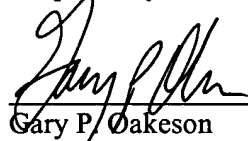
The Examiner has rejected claims 6-12 under 35 U.S.C. 103(a) as being unpatentable over Yang in view of Cohen. As discussed above, the newly amended claims require that the dispensing system be an ink-jet printing dispensing system. Neither Yang nor Cohen teaches an ink-jet dispensing system. In addition, neither Yang nor Cohen teach the importance of curing the build material before applying the support material. Therefore, each and every element of claims 1 and 26 are not taught by the combination of the two cited references. As such, it is respectfully requested that this rejection be withdrawn and all the claims, both independent and dependent, be allowed.

In view of the foregoing, Applicant believes that claims 1-16 and 26 present allowable subject matter and allowance is respectfully requested. If any impediment to the allowance of these claims remains after consideration of the above remarks, and such impediment could be removed during a telephone interview, the Examiner is invited to telephone Timothy F. Myers (Registration No. 42,919) at (541) 715-4197 so that such issues may be resolved as expeditiously as possible.

Please charge any additional fees except for Issue Fee or credit any overpayment to Deposit Account No. 08-2025

Dated this 10th day of November, 2005.

Respectfully submitted,



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